

Application No. 10/024,746
Election of Invention Dated April 21, 2005
Reply to Office Action of April 6, 2005

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 82 (Previously Presented) A lightweight door for motor vehicles comprising:
a supporting frame comprising a U-shaped portion comprising a hinge support forming one U-limb, a lock support forming the other U-limb, and a door bottom that interconnects the hinge support and lock support;
inner and outer window gutter profiles made from light metal or a light metal alloy and welded to the hinge support and lock support, wherein if the lightweight door is installed in a motor vehicle body, the inner and outer window gutter profiles are essentially aligned in the longitudinal direction of the motor vehicle body;
a lateral impact protection element having first and second ends welded to the supporting frame, wherein the lateral impact protection element is an extruded profile made from light metal or a light metal alloy; and
a window frame made of light metal or a light metal alloy, the window frame having first and second ends welded to the inner window gutter profile;
wherein the supporting frame is a non-cast one piece light metal or light metal alloy sheet selected from the group consisting of a pressed sheet and a deep drawn sheet;
wherein reinforcement and connection sheets are arranged on the supporting frame and permanently connected to the supporting frame by a connection technique selected from the group consisting of press-riveting, bonding, and welding;
wherein the reinforcement and connection sheets are parts selected from the group consisting of pressed parts and deep drawn parts;
wherein at the hinge support the reinforcement and connection sheets form hollow chambers with the supporting frame.

Claim 83 (Previously Presented) The lightweight door of claim 82, wherein the supporting frame comprises aluminum.

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Claim 84 (Previously Presented) The lightweight door of claim 83, wherein the supporting frame has a thickness of approximately 1.2 millimeters to approximately 1.8 millimeters.

Claim 85 (Previously Presented) The lightweight door of claim 84, wherein the supporting frame has a thickness of 1.6 millimeters.

Claim 86 (Previously Presented) The lightweight door of claim 82, wherein a single-part outer skin of the door is permanently connected to the supporting frame and the outer window gutter profile.

Claim 87 (Previously Presented) The lightweight door of claim 82, wherein the supporting frame forms part of an inside skin of the door.

Claim 88 (Previously Presented) The lightweight door of claim 82, further comprising an area-shaped cross stay which closes the U-shaped portion and which is located opposite the door bottom.

Claim 89 (Previously Presented) The lightweight door of claim 82, wherein structural frame gussets are formed at the connections between the supporting frame, inner door gutter profile, lateral impact protection element and window frame.

Claim 90 (Previously Presented) The lightweight door according to claim 89, wherein reinforcement and connection sheets are arranged on the supporting frame and permanently connected to the supporting frame at the structural frame gussets by a connection technique selected from the group consisting of press-riveting, bonding, and welding.

Claim 91 (Previously Presented) The lightweight door of claim 82, wherein the inner window gutter profile is a box-section extrusion profile.

Claim 92 (Previously Presented) The lightweight door of claim 82, wherein the inner window gutter profile is straight.

Claim 93 (Previously Presented) The lightweight door of claim 82, wherein the first and second ends of the lateral impact protection element are permanently attached to the supporting frame by brackets.

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Claim 94 (Previously Presented) The lightweight door of claim 82, wherein upper and lower hinge point strengthening plates, made from light metal or a light metal alloy, are permanently attached to the hinge support.

Claim 95 (Previously Presented) The lightweight door of claim 94, wherein the lateral impact protection element on a front side door is arranged so as to slope downward from the hinge support to the lock support, and a free limb of the upper hinge point strengthening plate is L-shaped and directly welded together with the first end of the lateral impact protection element.

Claim 96 (Previously Presented) The lightweight door of claim 82, wherein the first and second ends of the window frame extend beyond the front and rear ends of the inner window gutter profile, where the first and second ends of the window frame are permanently connected to the inner window gutter profile.

Claim 97 (Previously Presented) The lightweight door of claim 82, wherein the first and second ends of the window frame abut on top of the front and rear ends of the inner window gutter profile, where the first and second ends of the window frame are permanently connected to the inner window gutter profile.

Claim 98 (Previously Presented) The lightweight door of claim 82, wherein the window frame on the side facing the lock support is reinforced by an elongated frame reinforcement part (11d).

Claim 99 (Previously Presented) The lightweight door of claim 98, wherein the frame reinforcement part (11d) is selected from the group consisting of a pressed part and a deep drawn part made from light metal or a light metal alloy, the frame reinforcement part (11d) being welded to the window frame.

Claim 100 (Previously Presented) The lightweight door of claim 99, wherein the frame reinforcement part (11d) is also welded to the outer window gutter profile.

Claim 101 (Previously Presented) The lightweight door of claim 98, wherein the window frame has an upper angular section integrated in the frame reinforcement part (11d).

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Claim 102 (Previously Presented) The lightweight door of claim 82, wherein a mirror triangle is formed at a top end of the hinge support and a cross stay, above the inner window gutter profile.

Claim 103 (Previously Presented) The lightweight door of claim 102, wherein the mirror triangle is a reinforcement and connection sheet.

Claim 104 (Previously Presented) The lightweight door of claim 82, wherein the light metal is aluminum and the light metal alloy is an aluminum alloy.

Claim 105 (Previously Presented) The lightweight door of claim 82, wherein the light metal is magnesium and the light metal alloy is magnesium alloy.

Claim 106 (Previously Presented) A lightweight door for motor vehicles comprising:

a supporting frame comprising a U-shaped portion comprising a hinge support forming one U-limb, a lock support forming the other U-limb, and a door bottom that interconnects the hinge support and lock support;

inner and outer window gutter profiles made from light metal or a light metal alloy and welded to the hinge support and lock support, wherein if the lightweight door is installed in a motor vehicle body, the inner and outer window gutter profiles are essentially aligned in the longitudinal direction of the motor vehicle body;

a lateral impact protection element having first and second ends welded to the supporting frame, wherein the lateral impact protection element is an extruded profile made from light metal or a light metal alloy; and

a window frame made of light metal or a light metal alloy, the window frame having first and second ends welded to the inner window gutter profile;

wherein the supporting frame is a non-cast one piece light metal or light metal alloy sheet selected from the group consisting of a pressed sheet and a deep drawn sheet;

an area-shaped cross stay which closes the U-shaped portion and which is located opposite the door bottom; and

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reinforcement and connection sheets arranged on the supporting frame and permanently connected to the supporting frame by a connection technique selected from the group consisting of press-riveting, bonding, and welding;

wherein the reinforcement and connection sheets are parts selected from the group consisting of pressed parts and deep drawn parts;

wherein at the hinge support the reinforcement and connection sheets form hollow chambers with the supporting frame;

wherein upper and lower hinge point strengthening plates, made from light metal or a light metal alloy, are permanently attached to the hinge support.

Claim 107 (Previously Presented) The lightweight door of claim 106, wherein the light metal is magnesium and the light metal alloy is magnesium alloy.

Claim 108 (Previously Presented) The lightweight door of claim 106, wherein the light metal is aluminum and the light metal alloy is aluminum alloy.

Claim 109 (Previously Presented) A lightweight door for motor vehicles comprising:

a supporting frame comprising a U-shaped portion comprising a hinge support forming one U-limb, a lock support forming the other U-limb, and a door bottom that interconnects the hinge support and lock support;

inner and outer window gutter profiles made from light metal or a light metal alloy and welded to the hinge support and lock support, wherein if the lightweight door is installed in a motor vehicle body, the inner and outer window gutter profiles are essentially aligned in the longitudinal direction of the motor vehicle body;

a lateral impact protection element having first and second ends welded to the supporting frame, wherein the lateral impact protection element is an extruded profile made from light metal or a light metal alloy; and

a window frame made of light metal or a light metal alloy, the window frame having first and second ends welded to the inner window gutter profile;

wherein the supporting frame is a non-cast one piece light metal or light metal alloy sheet selected from the group consisting of a pressed sheet and a deep drawn sheet;

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wherein reinforcement and connection sheets are arranged on the supporting frame and permanently connected to the supporting frame by a connection technique selected from the group consisting of press-riveting, bonding, and welding;

wherein the reinforcement and connection sheets are parts selected from the group consisting of press parts and deep drawn parts;

wherein at the hinge support, the reinforcement and connection sheets form hollow chambers with the supporting frame;

wherein upper and lower hinge point strengthening plates, made from light metal or a light metal alloy, are permanently attached to the hinge support;

wherein the first and second ends of the window frame extend beyond the front and rear ends of the inner window gutter profile, where the first and second ends of the window frame are permanently connected to the inner window gutter profile.

Claim 110 (Previously Presented) The lightweight door of claim 109, wherein the light metal is aluminum and the light metal alloy is aluminum alloy.

Claim 111 (Previously Presented) The lightweight door of claim 109, wherein the light metal is magnesium and the light metal alloy is magnesium alloy.

Claim 112 (Previously Presented) A lightweight door for motor vehicles comprising:

a supporting frame comprising a U-shaped portion comprising a hinge support forming one U-limb, a lock support forming the other U-limb, and a door bottom that interconnects the hinge support and lock support;

inner and outer window gutter profiles made from light metal or a light metal alloy and welded to the hinge support and lock support, wherein if the lightweight door is installed in a motor vehicle body, the inner and outer window gutter profiles are essentially aligned in the longitudinal direction of the motor vehicle body;

a lateral impact protection element having first and second ends welded to the supporting frame, wherein the lateral impact protection element is an extruded profile made from light metal or a light metal alloy; and

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a window frame made of light metal or a light metal alloy, the window frame having first and second ends welded to the inner window gutter profile;

wherein the supporting frame is a non-cast one piece light metal or light metal alloy sheet selected from the group consisting of a pressed sheet and a deep drawn sheet;

wherein reinforcement and connection sheets are arranged on the supporting frame and permanently connected to the supporting frame by a connection technique selected from the group consisting of press-riveting, bonding, and welding;

wherein the reinforcement and connection sheets are parts selected from the group consisting of pressed parts and deep drawn parts;

wherein at the hinge support, the reinforcement and connection sheets form hollow chambers with the supporting frame;

wherein upper and lower hinge point strengthening plates, made from light metal or a light metal alloy, are permanently attached to the hinge support;

wherein the first and second ends of the window frame abut on top of the front and rear ends of the inner window gutter profile, where they are permanently connected to the inner window gutter profile.

Claim 113 (Previously Presented) The lightweight door of claim 112, wherein the light metal is aluminum and the light metal alloy is aluminum alloy.

Claim 114 (Previously Presented) The lightweight door of claim 112, wherein the light metal is magnesium and the light metal alloy is magnesium alloy.

Claim 115 (Previously Presented) A lightweight door for motor vehicles comprising:

a supporting frame comprising a U-shaped portion comprising a hinge support forming one U-limb, a lock support forming the other U-limb, and a door bottom that interconnects the hinge support and lock support;

inner and outer window gutter profiles made from light metal or a light metal alloy and fixedly connected to the hinge support and lock support, wherein if the lightweight door is installed in a motor vehicle body, the inner and outer window gutter profiles are essentially aligned in the longitudinal direction of the motor vehicle body;

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a lateral impact protection element having first and second ends fixedly connected to the supporting frame, wherein the lateral impact protection element is an extruded profile made from light metal or a light metal alloy; and

a window frame made of light metal or a light metal alloy, the window frame having first and second ends fixedly connected to the inner window gutter profile;

wherein the supporting frame is a non-cast one piece light metal or light metal alloy sheet selected from the group consisting of a pressed sheet and a deep drawn sheet;

wherein the supporting frame forms part of an inside skin of the door;

an area-shaped cross stay which closes the U-shaped portion and which is located opposite the door bottom;

reinforcement and connection sheets arranged on the supporting frame and permanently connected to the supporting frame by a connection technique selected from the group consisting of press-riveting, bonding, and welding;

wherein structural frame gussets are formed at the connections between the supporting frame, inner window gutter profile, lateral impact protection element and window frame.

Claim 116 (Previously Presented) The lightweight door of claim 115, wherein the reinforcement and connection sheets are selected from the group consisting of pressed parts and deep drawn parts.

Claim 117 (Previously Presented) The lightweight door of claim 115, wherein at the hinge support the reinforcement and connection sheets form hollow chambers with the supporting frame.

Claim 118 (Previously Presented) The lightweight door of claim 115, wherein the light metal is aluminum and the light metal alloy is aluminum alloy.

Claim 119 (Previously Presented) The lightweight door of claim 115, wherein the light metal is magnesium and the light metal alloy is magnesium alloy.

Claim 120 (Withdrawn) A method of making a lightweight door for motor vehicles, the method comprising the steps of:

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deep drawing a supporting frame, wherein the supporting frame comprises a U-shaped portion comprising a hinge support forming one U-limb, a lock support forming the other U-limb, and a door bottom that interconnects the hinge support and the lock support;

welding inner and outer window gutter profiles to the hinge support and lock support, the inner and outer window gutter profiles made from light metal or a light metal alloy, wherein if the lightweight door is installed in a motor vehicle body, the inner and outer window gutter profiles are essentially aligned in the longitudinal direction of the motor vehicle body;

welding a lateral impact protection element having first and second ends to the supporting frame, wherein the lateral impact protection element is an extruded profile made of light metal or a light metal alloy; and

welding a window frame having first and second ends to the inner window gutter profile, the window frame made of light metal or light metal alloy.

Claim 121 (Withdrawn) A method of making a lightweight door for motor vehicles, the method comprising the steps of:

pressing a supporting frame, wherein the supporting frame comprises a U-shaped portion comprising a hinge support forming one U-limb, a lock support forming the other U-limb, and a door bottom that interconnects the hinge support and the lock support;

welding inner and outer window gutter profiles to the hinge support and lock support, the inner and outer window gutter profiles made from light metal or a light metal alloy, wherein if the lightweight door is installed in a motor vehicle body, the inner and outer window gutter profiles are essentially aligned in the longitudinal direction of the motor vehicle body;

welding a lateral impact protection element having first and second ends to the supporting frame, wherein the lateral impact protection element is an extruded profile made of light metal or a light metal alloy; and

welding a window frame having first and second ends to the inner window gutter profile, the window frame made of light metal or light metal alloy.